

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
IP/P7051/WOD	International filing date (day/month/year)	(Earliest) Priority Date (day/month/year)
International application No.	07/08/2003	12/08/2002
PCT/GB 03/03398		
Applicant		
QINETIQ LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

TEMPERATURE RESPONSIVE SAFETY DEVICES FOR MUNITIONS

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

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Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The invention comprises devices for mitigating the explosive reaction of a munition when it is subject to an external thermal hazard threat. In one arrangement there is device which consists of a connector (4) that is at least in part formed from a shape memory alloy, which typically undergoes large dimensional changes when heated or cooled through a particular transition temperature range. The connector in this invention is designed to form a locking engagement, between two components of a munitions casing at one temperature, but when subjected to external heating through the transition temperature range will deform to allow the connector to disengage and thus release the two joined components (1,1a), allowing any build up of pressure to be released quickly. If the co-operative parts of the connector and components are threaded portions (2,2a,3), then the locking engagement will be capable of being dismantled during normal servicing of the munition. In another arrangement the device is an annulus (24) and is located around a munitions casing (22) such that upon heating through its transition temperature range will cause the annulus to contract, thereby rupturing the munitions casing, allowing any build up of pressure to be released quickly.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F42B39/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F42B C22F F16B F16K F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓ FR 2 686 410 A (ETAT FRANCAIS) 23 July 1993 (1993-07-23)	18-21, 47, 48
Y	page 4, line 1 - line 26	1-10, 17, 19-22
A	page 4, line 33 - page 6, line 3; claims 1-5; figures 1,2	33-46
X	✓ EP 0 738 869 A (PROTAC) 23 October 1996 (1996-10-23)	47, 48
Y	column 3, line 23 - column 6, line 36	1-10, 17
A	claims 1-5; figures 1,2,4	18-46
X	✓ US 5 060 470 A (VANNAME) 29 October 1991 (1991-10-29)	47, 48
A	column 4, line 9 - line 27; claims 1-4 figures 1,2	1-46
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

4 December 2003

Date of mailing of the international search report

26/01/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040. Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Giesen, M

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 198 43 965 A (DAIMLERCHRYSLER) 6 April 2000 (2000-04-06) column 3, line 10 - line 45; figures 1-6 ---	11-15
X	✓ PATENT ABSTRACTS OF JAPAN vol. 018, no. 147 (M-1575), 11 March 1994 (1994-03-11) -& JP 05 322074 A (NIPPON STEEL CORP;OTHERS: 01), 7 December 1993 (1993-12-07) abstract	23-29
Y		19-22
A		30-32
X	✓ PATENT ABSTRACTS OF JAPAN vol. 017, no. 447 (M-1464), 17 August 1993 (1993-08-17) -& JP 05 099377 A (NIPPON STEEL CORP;OTHERS: 01), 20 April 1993 (1993-04-20) abstract	23
A		19-22, 24-32
X	WO 02 03019 A (SAAB) 10 January 2002 (2002-01-10) page 4, line 26 -page 5, line 31; claims 1-5; figures 1,2 ---	47,48
A		1-46
A	WO 90 12237 A (RAYCHEM) 18 October 1990 (1990-10-18) ---	
A	US 6 321 656 B1 (JOHNSON) 27 November 2001 (2001-11-27) cited in the application -----	

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Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2686410 ✓	A	23-07-1993	FR 2686410 A1	23-07-1993
EP 738869 ✓	A	23-10-1996	FR 2733316 A1 EP 0738869 A1	25-10-1996 23-10-1996
US 5060470 ✓	A	29-10-1991	NONE	
DE 19843965 ✓	A	06-04-2000	DE 19843965 A1 CA 2344684 A1 CN 1110429 B WO 0017051 A1 DE 59906122 D1 EP 1115615 A1 JP 2003512963 T US 6450725 B1	06-04-2000 30-03-2000 04-06-2003 30-03-2000 31-07-2003 18-07-2001 08-04-2003 17-09-2002
JP 05322074 ✓	A	07-12-1993	NONE	
JP 05099377 ✓	A	20-04-1993	NONE	
WO 0203019 ✓	A	10-01-2002	SE 519561 C2 AU 7475901 A EP 1297303 A1 NO 20030006 A SE 0002504 A WO 0203019 A1	11-03-2003 14-01-2002 02-04-2003 28-02-2003 04-01-2002 10-01-2002
WO 9012237 ✓	A	18-10-1990	WO 9012237 A1	18-10-1990
US 6321656 ✓	B1	27-11-2001	NONE	